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AND

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## Bailey's Patent Steam Engine.

The essential requisites in a steam engine in order to excel in the present advanced stage of its improvement, are lightness, strength, compactness, and simplicity, so that it can be easily transported, occupy but little space, be readily put up and operated by engineers of ordinary capacity and limited experience. The working parts should be few and durable, and protected from the injurious effects of dust and dirt.

In the engine represented the elements above mentioned seem to be combined in an eminent degree.

The crank of this engine, with its connecting-rod, etc., is inclosed in a steam-tight head, so arranged as to form an extension from one end of the cylinder in which the piston works, and to this piston the connecting-rod is directly pivoted and the opposite end actuating the fly-wheel. To close the communication between the cylinder and the hollow head, a transverse slide is fitted with a rocking-block through which the connecting-rod passes, the combined action of which provides for the free motion of the connecting-rod, and, at the same time, forming a sufficiently steam tight division between the cylinder and head.

Fig. 1 is a perspective view of the engine, and Fig. 2 is a vertical section of the same. Upon the standards, A, A, is secured a cylinder with its attached head, and they support the necessary accompaniments of valves, etc., necessary for the action of the engine. A piston, C, is fitted to the cylinder, and is made of sufficient length to form in itself a guide in its reciprocating motion. One end of this piston is hollowed out to receive one end of the connecting-rod which is pivoted to it, the opposite end of the rod being attached to the wrist-pin, S, of the disk, G, which is keyed to the shaft of the fly-wheel. This disk is inclosed in the extension, D, of the cylinder, and the form of this extension is such as to correspond to the travel of the connecting-rod, E. This arrangement of parts not only dispenses with a piston-rod, cross-head, etc, but forms a steady-working and compact form of engine, having its crank and connecting-rod concealed from view and injury. To close the communication between the forward end of the cylinder, B, and the head, D, so as to exclude the steam which would otherwise fill it, and would consequently be exhausted with every stroke of the cylinder, proving a loss, a slide, H, is fitted in a case, so that a free vertical motion is given to the slide by the motion of the connecting-rod. Through a central opening of this slide the connecting-rod passes; and to form a steam-tight joint the rod passes through a rocking-block, I, which has a curved form of face to correspond with a similar curvature made in the slide. By the motion induced by the connecting-rod the slide works up and down, and the block works in its seat in an oscillating manner, presenting no impediment to the operation of the rod, and by the combined action of the slide and rocking-block the connecting rod has free passage and play in a sufficient steam-tight manner without the aid of a stuffing box; but inasmuch as the head, D, forms a steam-tight inclosure, it is by no means necessary that the slide, H, or the block, I, be otherwise than a good working fit, and packing may be dispensed with.

It will be observed that the steam-tight extension, D, of the cylinder, incloses all the principal working parts, which serves to keep them well lubricated, and prevents the ingress of dust, dirt, or other foreign substances.

This makes it especially applicable to street cars, and we understand it now being introduced in an experimental car in this city.

This engine was patented on March 19, 1867, and another patent has just been allowed for improvements.

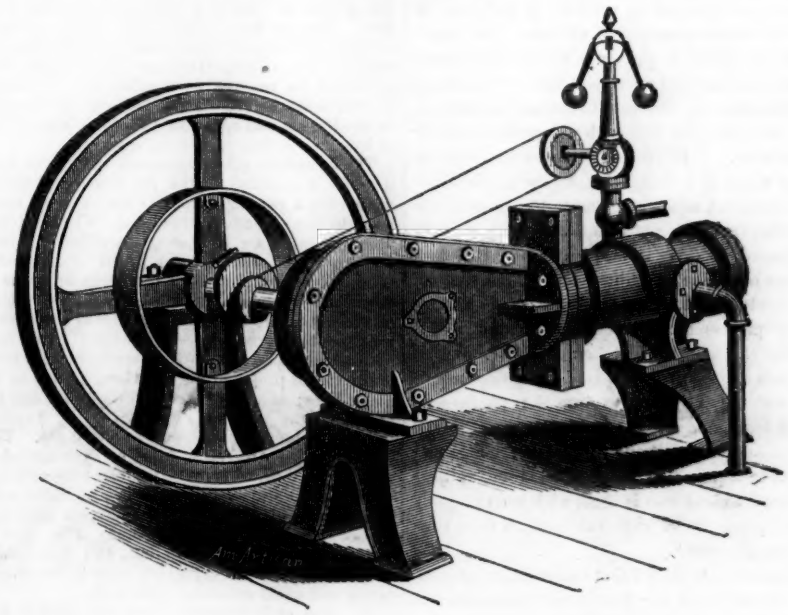
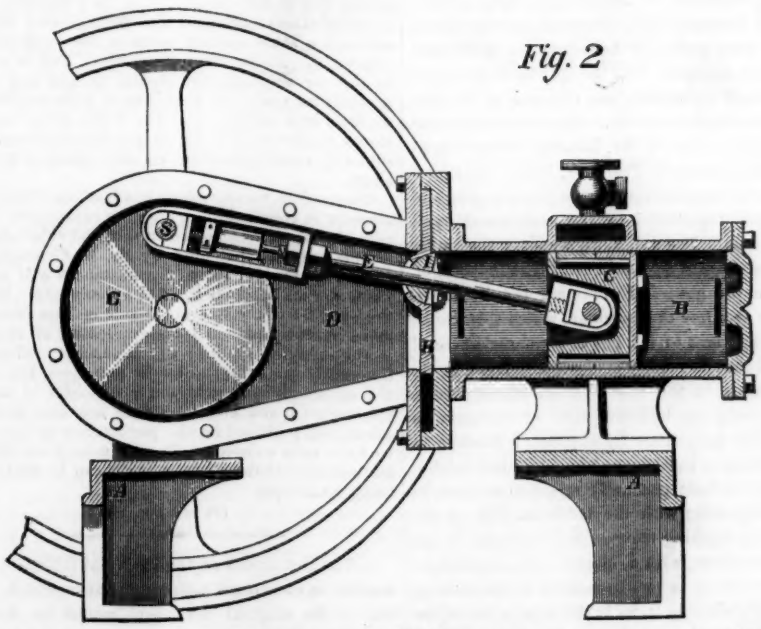


*Fig. 2*




These engines are on sale at the salesrooms of the Eureka Pump Company, 42 Dey-street, New York, and orders will be received and further information given, by addressing Messrs. Romer, Pease & Pease, at the same place.

## Purification of Gas.

[From "Clegg on the Manufacture of Coal Gas."]

(Continued from page 194.)

During the experiments at the Westminster Gas-works in December, 1849, an unexpected difficulty arose, for the spent purifying material could not be revived on exposure to air. This led to an investigation by Mr. Laming and Mr. Lewis Thompson, from which it appeared that the ordinary oxidizing action had been obstructed by the crystalizing of the muriate of lime, owing to the extremely cold weather, and it has been ascertained that this effect is always produced when the temperature is below 20° Fahr.

The mode of operating with the oxide of iron, at the Liverpool Gas-works, was described by Mr. Alfred King and explained by Mr. Lewis Thompson, in their evidence on the trial of the validity of Mr. Hill's patent, to the following effect: Common green copperas (sulphate of iron) is put into a mill, adding a little water to make it a pasty mass. Slaked lime is then added in the proportion of one part to two of the copperas, with water sufficient to make the whole, when ground together, of the consistence of a stiff paste. It is then removed and cut into pieces with a spade, and as it dries it becomes a powder, which consists of sulphate of lime and hydrated sesquioxide of iron. The powder after being sifted is put into the purifier, where the oxide of iron becomes converted into sulphuret of iron, and that again by exposure to the air becomes reconverted into oxide of iron with a deposition of sulphur in the mass. This process is repeated about 28 times, after which it is found that, owing to the accumulation of sulphur, which amounts to 40 per cent., the same material cannot be put into the purifier, its bulk being increased one-half its original size. It is then roasted in an oven, the sulphur being in the first instance distilled from the mass, and collected. During the roasting process the iron becomes red-hot, and is rendered anhydrous. When taken out of the oven it is thrown into the open yards to cool; it is then moistened with water, and again put into the purfiers to commence a fresh succession of repeated actions. The oxide of iron after it has been in the oven remains permanently anhydrous; thus, in a short time, nothing but anhydrous oxide of iron is used, with the exception of the small quantities of fresh oxide added from time to time to supply waste.

It has been already stated that the difficulty of purification arises not from the presence of ammonia, but from its deficiency, the quantity of it contained in the gas not being sufficient to saturate the sulphuretted hydrogen and carbonic acid. Several attempts have consequently been made to introduce an additional quantity of free ammonia into the gas to be purified, for the purpose of facilitating the removal of the carbonic and hydrosulphuric acids. The most successful of these attempts is that of Mr. Laming, who obtained a patent for the process in February, 1857. He mixes hydrosulphate of ammonia with the impure gas, and introduces both together into the purifiers charged with oxide of iron. The oxide decomposes the introduced hydrosulphate of ammonia as well as that originally present in the gas; and retaining the hydrosulphuric acid, it sets free the ammonia, which then unites with the carbonic acid of the gas to form carbonate of ammonia, and that is readily removable by the scrubber. Mr. Laming, in the specification of his patent, proposes to obtain the hydrosulphate of ammonia, to be added to the gas, either by exposing a mixture in equal proportions of carbonate of ammonia and sulphuret of sodium to a heat gradually raised to redness, in retorts communicating with the induction-pipe of the purifiers; or by washing the gas, on its passage to the oxide-of-iron purifiers, with a solution of hydrosulphate of ammonia so strong as to surrender it to the passing gas instead of absorbing it, as is the case when ordinary gas-liquor is used in washers or scrubbers for the purpose of being strengthened. The quantity of hydrosulphate required will of course vary with the kind of coal distilled, but the rule laid down is to make the quantity so great that the gas, on leaving the purifiers shall contain no carbonic acid that cannot be washed out of it by a little water.

The cost of producing the hydrosulphate of ammonia in the manner proposed, by distilling carbonate of ammonia and sulphuret of sodium, would have rendered this process inapplicable on a working scale. To make the invention complete, as Mr. Laming observes, "an apparatus was needed that should be effectual for washing out from the scrubbed gas its ammoniacal compounds, by means of so little water as would admit of the resulting solution being mixed and used with the purifying liquor." And he proceeds to say: "By means of certain appliances, which vary somewhat in detail with the state of the works to which they are to fitted, not only may all the impurities be washed out of the gas by water, but also by so small a quantity of it as shall at last present the ammoniacal compounds in the form of concentrated solution; and I have supplementary means, quite unobjectionable in a sanitory and every other point of view, for giving to all the ammonia, when it has performed the office of purifying a valuable marketable form." The apparatus to which Mr Laming refers is a "double diaphragm scrubber," included in the specification of the same patent.

Mr. Croll, in 1663, patented a process of purification which consists in combining neutral salts, such as the sulphate of alumina, or the chloride or sulphate of zinc, manganese or iron in a concentrated form, with sawdust. The gas is subjected to the action of the material immediately after condensation, and before the removal of the sulphuretted hydrogen, which Mr. Croll preferred to remove by a subsequent process. The neutral salts revivify on exposure to the air, and may be used again and again in the same manner as oxide of iron.

The numerous other processes that have been contrived and patented for the purification of coal gas require only a passing notice, as few of them have been brought into practical operation. Various plans have been proposed for increasing the efficacy of lime, and for preventing the offensive smell occasioned by the escape of the sulphuretted hydrogen from the refuse. Some of those plans have been previovsly mentioned, of which the one combining the use of sulphate of lime promises the most successful results. The slaking of lime with diluted sulphuric or muriatic acid is another of the means proposed for absorbing ammonia with the use of lime; and in a patent obtained by Mr. Laming, he claims the use of quick-lime in the purifiers as a means of absorbing moisture from the gas. Professor Graham suggested the addition of hydrous sulphate of soda to the lime, to increase its absorbing action, which, with that addition it is stated, is prolonged until two equivalents of sulphuretted hydrogen have been absorbed by one equivalent of lime. The lime is thus converted into sulphate of lime, and the soda into bi-hydrosulphuret of soda, which may be removed by solution and again converted into soda.

The use of ferruginous clay and gravel has been patented for the purification of gas, their action being chiefly due to the oxide of iron they contain. When these substances are used, the sulphuretted hydrogen acts in the same manner as when the oxide of iron is employed. It first turns them black, and on exposure to the air they speedily absorb oxygen and become again fit for use. Mr. F. J. Evans patented the use of oxidized iron borings; and the refuse from the grindstones employed in polishing gun barrels has also been similarly used in Birmingham and elsewhere with good effect.

Charcoal in various forms has been employed, either alone or in combination with other substances. A mixture of peat charcoal, common salt, and superphosphate of lime has been patented by Mr. W. Chisholm, as an efficacious purifier when circumstances will admit of the materials being obtained at a cheap rate. Mr. Hills, the patentee of the hydrated oxide of iron process, has more recently patented the application of steam and warm purifying liquids; and Mr. Laming, whose name frequently occurs in the list of patentees, has claimed the use of sulphuric acid and phosphates of ammonia. Oil, naphtha, and bog-head coke, are also among the substances patented for the purification of gas, but, as we have before observed, there is none more efficacious and economical than lime, when it can be used without being a nuisance.

(To be continued.)

—The Net profits of the Paris Exhibition, it is said, amount to over three millions of francs, which, according to the original agreement, would be divided in equal portions between the government, the city of Paris, and the guarantors. It is said that the latter will refuse to receive any gratuity, and that if the State and city will follow their example, the entire proceeds will be devoted to some public purpose.

## A New Disinfectant for Stables and Barns.

Before saying anything as to the properties of sulphurous acid gas as a disinfectant, it may be proper to say a word as to the meaning of the word *disinfectant*. Disinfectants, whatever may be their elements of composition or action, necessarily are such as remove the causes of infection and contagion, and to accomplish this purpose a number of substances of a class are in use, and are known by the name of antiseptics, or agents that prevent animal or vegetable matter from being deodorized, that act by destroying hurtful and bad smells arising from decomposing material, and capable of communicating disease, if not destroyed by means of disinfectants. Many substances in nature are recommended to be used as disinfectants. One is inert and of no effect; another is filthy and not easily managed, and another destroys the fertility of the barn yard manure as such. How important for the farmer then is this new disinfectant that we now sincerely recommend to them, and which was first introduced for the purpose of staying the ravages of the rinderpest among the cattle in England. It did this to greater perfection than any other substance that had been tried, if we except carbolic acid.

Sulphuric acid gas is generated or produced by fire and sulphur-brimstone—is simple and very cheap and the process is as follows: Procure a small chaffer or red hot cinder from a coal fire, set a small crucible on the hot coals, and put a piece of brimstone stick as large as a man's thumb into it. This will fumigate a large cattle shed or barn in about twenty minntes. Contrary to the expectation first entertained, the animals seemed to enjoy the flames, and it has proven a tonic as well as disinfectant to them. The results from experiments with it are shown, which lead to the conviction that the diseases, such as cholera, pleuropneumonia, mange, ring-worm and lice have disappeared before this gas, and that greasy heels in horses have been cured by it, while serious cases of glanders have also been amended by the judicious use of the hitherto considered poisonous gas. In addition to the use of this gas, sanitary measures should be enforced in regard to cleanliness and a thorough ventilation, with the allowance of a generous diet. During the prevalence of any of the above named diseases the fumigation may be made four or five times a day.

R. McClure,
Veterinary Surgeon, Philadelphia.

## Exports of Petroleum Irom Philadelphia.

The following is a statement of the destination, quality and value of the Petroleum exported from Philadelphia during the year 1867, also a comparison with previous years:

| | Gallons. | Value. |
|---|---|---|
| Great Britain | 6,074,040 | $1,796,038 |
| Antwerp | 7,966,514 | 2,278,789 |
| France | 4,264,725 | 1,128,315 |
| Bremen | 4,302,377 | 1,147,608 |
| Hamburg | 985,958 | 254,131 |
| Prussia | 668,440 | 181,414 |
| Spain | 169,830 | 48,233 |
| Russia | 696,830 | 184,423 |
| Portugal | 118,055 | 31,001 |
| Sweden | 82,694 | 10,940 |
| Rotterdam | 1,838,502 | 520,261 |
| Italy | 1,397,955 | 404,900 |
| West Indies | 186,030 | 66,285 |
| Total 1867 | 28,751,445 | $8,053,233 |
| " 1866 | 26,836,088 | 11,274,597 |
| " 1865 | 12,032 934 | 5,441,274 |
| " 1864 | 7,566,925 | 4,294,754 |
| " 1863 | 4,930,708 | 1,382,080 |

The following are the receipts of Petroleum via Pennsylvania Railroad, at the port of Philadelphia, for the last five years:

| | | | |
|---|---|---|---|
| 1867, barrels | 192,008 | 551,790 | 743,768 |
| 1866, " | .. | .. | 424,504 |
| 1865, " | .. | .. | 440,199 |
| 1864, " | .. | .. | 420,714 |
| 1863, " | .. | .. | 596,831 |

The Pennsylvania railroad also carried a considerable number of barrels of Petroleum destined for Baltimore, New York and other points.

The quantity of Petroleum exported from Philadelphia to foreign ports in 1867 (28.751,445 gallons) was equal to 638,921 barrels of 45 gallons each.

The superior advantages and facilities existing at Philadelphia are exhibiting a natural consequence, and result in the concentration of a larger Petroleum trade from year to year, on the Delaware and the Schuylkill, whence it is cleared for foreign markets.—*Min. Reg.*

## More Water for San Francisco.

THE SAN FRANCISCO WATER COMPANY—A GIGANTIC PROJECT—A PROSPECT OF PLENTY OF WATER AT LAST—PESCADERO CREEK TO BE PUT ON TAP—THIRTY MILLION GALLONS OF WATER A DAY.

[From the San Francisco Times.]

(Continued from page 195.)

THE BOSTON AQUEDUCT.

The city of Boston is supplied with water from Lake Cochituate, formerly known as Long Pond, in Farmingham and Natick, 19½ miles distant from the fountain on Boston Common, and 23½ miles from the reservoir at East Boston. The work of constructing the aqueduct was commenced in August, 1846, and completed in October, 1848. The source comprehend a water area of 684 acres, the greatest depth being 70 feet; at a stage of water lower than this by 6½ feet, the area is 504 acres. The water-bed that feeds this source is an area of 16,400 acres. The lake furnishes a daily supply of 10,176,570 wine gallons. The quantity calculated as necessary was 7,250,000 gallons, which would give to a population of 250,000 inhabitants, 28½ gallons each per diem. Additional supplies were, however, deemed necessary, and the Jamaica Pond, in Roxbury, was secured, and may be used independently of the Cochituate water works, by the 10-inch pipe laid to the city in 1840. The capacity of this pond varies with the stage of the water, from 28,000,000 gallons to four times that quantity. The Cochituate aqueduct, from the lake to the receiving reservoir in Brookline, about fourteen miles, is for the greater part of the way, a conduit of brick masonry. Over the valley of the Charles river is a line of iron mains, and in Newton and Brookline are two tunnel excavations. The brick conduit winds, by irregular curves, along the country, where it is of such elevation as admits of the work being mostly beneath the natural surface. The brick work is eight inches thick, laid in hydraulic cement, the section of the conduit being that of an egg, the largest end down, the greatest width five feet, and the extreme internal height six feet four inches. It is everywhere covered with at least four feet of earth, and nowhere admits of a passage under it except by the culverts, at the crossing of Charles river, which it passes by two 30-inch iron pipes, placed on a stone bridge, 58 feet below the aqueduct on either side, and 71 feet above low water in the river. The descent, or fall, is 3.81 feet in the brick aqueduct, which is 14.446 miles long. In the pipe section, 956 feet long, it is 0.45 feet; total, 4.26 feet in 14.627 miles. With this fall, and a depth of three feet ten inches, the aqueduct is found sufficient to convey more than 10,000,000 gallons in 24 hours, a capacity considerably greater than was originally estimated with that depth. The capacity of the receiving reservoir at Brookline is 119,583,960 wine gallons, and the length of the distributing pipes, varying in diameter from 36 to 4 inches, is 112¼ miles. There are three distributing reservoirs, of the capacity severally of 2,678,961 gallons, 7,508,946 gallons, and 5,591,816 gallons. Ten public fountains are erected in different parts of the city, and supplied by the Cochituate aqueduct. The whole cost of the water works up to January, 1853, after the deduction of $513,069,48, received for water rents, was $5,370,818.

OTHER AQUEDUCTS.

Of the aqueducts at Philadelphia, Cincinnati, and Chicago and other large cities, now built, or in course of construction, we have not time to speak. The immense water works being constructed at Chicago, with the tunnel under Lake Ontario, deserve separate and lengthy articles. Our only object at present is to present such statistics regarding some of the great modern water works as may serve as a basis of comparison, and possibly for suggestion, in relation to the subject nearest to the interests of this city, and which we will enter upon, first gixing some figures relative to the water works at present supplying San Francisco.

THE SPRING VALLEY WATER WORKS.

The works of the Spring Valley Water Company are situated at Pilarcitos Valley, and the main supply is drawn from the creek bearing that name. The creek is dammed near the head of the valley, and a lake 2½ miles in length was thus formed, having a capacity of 800,000,000 gallons. Its source is at an elevation of nearly 700 feet above the city level of San Francisco. The water is conveyed around the mountain in a wooden flume 8½ miles in length, but a tunnel has recently been excavated in the base of the mountain, to obviate the necessity of carrying the water through this length of aqueduct. This tunnel is 3,348 feet long, 6 feet 4 inches high, 5 feet 6 inches wide at the bottom, and 4 feet 6 inches wide at the top. It is bricked and arched throughout. The company have also a reservoir at Lake Honda, the capacity of which is said to be 34,000,000 gallons. The distance the water is conveyed is 35 miles, but arrangements are being made by which this will be much shortened. The amount of water supplied to the city annually is 1,300,000,000.

THE SAN FRANCISCO WATER WORKS.

The San Francisco Water Works Company, with a capital stock of $6,000,000, filed articles of incorporation some five months ago, and immediately afterward Mr. Milo Hoadley received instructions to make a preliminary survey of the line proposed to be taken by them. That survey has been completed, and the results embodied in a printed report, which is now before us, and from which we shall quote largely in the course of our remarks. The company have purchased 400 acres of land on Pescadero Creek, in the Santa Cruz Mountains, and have run their line thence to Canada Raymundo, from which point to this city the ground has been already surveyed and described. As the report of the engineer conveys the information in a clear and concise manner as to the line of route proposed to be taken, we append it.

THE LINE OF THE AQUEDUCT.

Having located the dam on Pescadero Creek, Mr. Hoadley says:

"Our line (from the dam) passes down the east bank of the Pescadero, cutting across several projecting points, and running through a heavy growth of redwood and thick underbrush.

"In crossing Jones Ridge, from the Pescadero to the San Gregorio valleys, a tunnel will be required 115 chains in length. The hill is of soft sandstone, and the tunneling can be done nearly as cheap as the same distance could be constructed in any other manner, as we will dispense with all clearing, fluming, or pipe. There are also several short tunnels required on the line before reaching Jones Creek, to which we deem it unnecessary to call your special attention, as they are all included in the general estimate. From the lower end of the tunnel through Jones Ridge, our line follows the bed of the south fork of the San Gregorio to Station 385, where we propose to put in a dam, and take up the waters of the creek. From this dam we continue down the north bank to the main San Gregorio or Woodhams Creek, which we cross at Station 428, with an elevation of 75 feet above its bed.

"Thence following down the north slope of the main creek, with several short tunnels through projecting points, we cross Rays creek, at Station 554 with 64 feet elevation.

"At Station 507 we first leave the heavy redwood timber, and except in the creek bottoms, we do not again encounter it.

"From Rays Creek we follow grade around the hillside to Rogus Creek, which we cross at Station 588, with 120 feet elevation; and following along the steep hillside with several tunnels of moderate length, we cross Keefers Creek, at Station 718, with an elevation of 70 feet; thence by another tunnel at Alamo Creek, and up along its east slope, crossing it at Station 746, and 195 feet above it.

"Our line then runs to the Corte Madeira by a tunnel through the ridge dividing the same from Alamo, and following up the east slope of the Corte Madeira, crossing several deep ravines (requiring high flumes), to Station 894, from which point we cross the creek at Station 904, with an elevation of 126 feet, and striking Raynors Ridge, tunnel through it to Allens Ravine.

"From this point we cross the dry or south fork of the Tornitas by two tunnels; but this portion of the line can be modified to only one—shortening the distance and decreasing the cost.

"We crossed the dry fork of the Tornitas at Station 1064, with an elevation of 80 feet, and turning through Downings Ridge, reach the middle fork at Station 1156, crossing it 205 feet above its bed; thence through the ridge to the north fork which we cross at Station 1203, with 60 feet elevation.

"Our line then continues through Irish Ridge to Lobitas Creek, and crossing it 67 feet above its bed, continues to the valley of the Purissima, which we cross near the house of Major Bowman, with 65 feet elevation.

"From the Purissima we tunnel into the Cañada Verda, crossing the south fork at Station 1534, with 90 feet, and the north fork at Station 1625, with 100 feet elevation, and by another tunnel reach the Cañada Leon, at Station 1724, and 138 feet above its bed.

"We then follow grade up and along the steep side of the valley to Station 1779, when we tunnel through the ridge to the valley of the Pilarcotis; up and along the slope of which we continue our divide, until we reach the main divide at the head of the valley, when, by another long tunnel, we reach the Canada Raymundo.

"Various modifications and alterations have been made, which will both shorten and cheapen the work; and we are of the opinion that still further alterations can be advantageously made. This, however, must be left for future surveys to determine.

"A considerable amount of clearing will be necessary above the dams on the Pescadero and south fork of the San Gregorio; and the timber cut will furnish all that will be required in the construction of dams, over falls, or any other purposes, in the immediate vicinity."

(To be continued.)

## How Chromos Are Made.

[From the Boston Daily Advertiser.]

Chromo-Lithography is the art of printing pictures from stone, in colors. The most difficult branch of it—which is now generally implied when chromos are spoken of—is the art of reproducing oil paintings. When a chromo is made by a competent hand, it presents an exact counterpart of the original painting, with the delicate gradations of tints and shades, and with much of the spirit and tone of a production of the brush and pallet.

To understand how chromos are made, the art of lithography must first be briefly explained. The stone used in lithographing is a species of limestone found in Bavaria, and is wrought into thick slabs with finely polished surface. The drawing is made upon the slab with a sort of colored soap, which adheres to the stone, and enters into a chemical combination with it after the application of certain acids and gums. When the drawing is complete, the slab is put on the press, and carefully dampened with a sponge. The oil color (or ink) is then applied with a common printer's roller. Of course, the parts of the slab which contain no drawing, being wet, resist the ink; while the drawing itself, being oily, repels the water, but retains the color applied. It is thus that, without a raised surface or incision—as in common printing, wood cuts, and steel engravings—lithography produces printed drawings from a perfectly smooth stone.

In a chromo, the first proof is a light ground-tint, covering nearly all the surface. It has only a faint, shadowy resemblance to the completed picture. It is in fact rather a shadow than an outline. The next proof, from the second stone, contains all the shades of another color. This process is repeated again and again and again; occasionally, as often as thirty times. We saw one proof, in a visit to Mr. Prang's establishment—a group of cattle—that had passed through the press twelve times; and it still bore a greater resemblance to a spoiled colored photograph than to the charming picture which it subsequently became. The number of impressions, however, does not necessarily indicate the number of colors in a painting, because the colors and tints are greatly multiplied by combinations created in the process of printing one over another. In twenty-five impressions, it is sometimes necessary and possible to produce a hundred distinct shades.

The last impression is made by an engraved stone, which produces that resemblance to canvas noticeable in all of Mr. Prang's finer specimens. English and German chromos, as a rule, do not attempt to give this delicate final touch, although it would seem to be essential in order to make a perfect imitation of a painting.

The paper used is white, heavy "plate paper," of the best quality, which has to pass through a heavy press, sheet by sheet, before its surface is fit to receive an impression

The process thus briefly explained, we need hardly add, requires equally great skill and judgment at every stage. A single error is instantly detected by the practised eye in the finished specimen. The production of a chromo, if it is at all complicated, requires several months—sometimes several years—of careful preparation. The mere drawing of the different and entirely-detached parts on so many different stones is of itself a work that requires an amount of labor and a degree of skill, which, to a person unfamiliar with the process, would appear incredible. Still more difficult, and needing still greater skill, is the process of coloring. This demands a knowledge which artists have hitherto almost exclusively monopolized, and, in addition to it, the practical familiarity of a printer with mechanical details. "Drying" and "registering," are as important branches of the art of making chromos as drawing and coloring. On proper registering, for example, the entire possibility of producing a picture at every stage of its progress depends. "Registering" is that part of a pressman's work which consists in so arranging the paper in the press that it shall receive the impression

on exactly the same spot of every sheet. In book work, each page must be exactly opposite the page printed on the other side of the sheet, in order that the impression, if on thin paper, may not "show through." In newspaper work this is of less importance, and often is not attended to with any special care. But in chromo-lithography the difference of a hair's-breadth would spoil a picture; for it would hopelessly mix up the colors.

After the chromo has passed through the press, it is embossed and varnished, and then put up for the market. These final processes are for the purpose of breaking the glossy light, and of softening the hard outlines which the picture receives from the stone, which imparts to it the resemblance of a painting on canvas.

Mr. Prang began his business in the humblest way, but has rapidly increased his establishment, until he now employs fifty workmen—nearly all of them artists and artisans of the most skillful class—and is preparing to move into a larger building at Roxbury. He uses 18 presses—and his sales are enormous. His catalogue now embraces a large number of Album cards, about seventy sets of twelve in each set; a beautiful series of illuminated "Beatitudes" and "Scriptural Mottoes;" an endless list of our great men, and of men not so great after all; of juveniles, notably, a profusely illustrated edition of "Old Mother Hubbard;" and of half chromos and chromos proper. Tait's "Chickens," "Ducklings," and "Quails," were the first chromos that met an instant and wide recognition. Nineteen thousand copies of the "Chickens" alone were sold. Bricher's "Early Autumn on Esopus Creek," is one of the best chromos ever made on a small scale. The "Bullfinch" and the "Linnet," (after Cruikshank) are admirable. There are other chromos which are less succesful, and one or two that are not successful at all; but they are nearly all excellent copies of the originals, with which the defects must be charged.

The chromos of Bricher's paintings are really wonderfully accurate.

Mr. Prang's masterpiece, however, is not yet published, although it is nearly ready for the market. It entirely surpasses all his previous efforts. It is Correggio's "Magdalena," and can hardly fail, we think, to command a quick sale and hearty recognition.

Like every modern discovery, chromo-lithography has its partisans and detractors—those who claim for it perhaps impossible capabilities, and those who regard it as a mere handicraft, which no skill can ever elevate into the dignity of an art. We do not care to enter into these disputes. Whether an art or a handicraft, chromo-lithography certainly *re*-produces charming little pictures vastly superior to any colored plates that we have had before; and it is, at least, clearly entitled to be regarded as a means of educating the popular taste, and thereby raising the national idea of art.

A correspondent, looking at chromos from this point of view, thus indicates (it may be somewhat enthusiastically) their possible influence on the culture of the people:

"What the discovery of the art of printing did for the mental growth of the people, the art of chromo-lithography seems destined to accomplish for their æsthetic culture. Before types were first made scholars and the wealthier classes had ample opportunities for study; for even when Bibles were chained in churches, and copies of the Scripture (then aptly so styled) were worth a herd of cattle, there were large libraries accessible to the aristocracy of rank and mind. But they were guarded against the masses by the double doors of privilege and ignorance. A book possessed no attractions for the man who could not read the alphabet; and, *because* they were rare and hard to get at, he had no incitement to master their mysteries. Made cheap and common, the meanest peasant, in the course of a few generations, found solace for his griefs in the pages of the greatest authors of his time and of all time. Mental culture became possible for whole nations; and de-democracy, with its illimitable blessings, gradually grew up under the little shadow of the first 'printer's proof.'

"Until within a quite recent period, art has been feudal in its associations. Galleries of priceless paintings, indeed, there have always been in certain favored cities and countries; but to the people, as a whole, they have been equally inaccessible and unappreciated, because no previous training had taught the community *how* to prize them. It was like Harvard College without the district school—a planet without satellites, and too far removed from the world of the people for its light to shine in the cottage and in the homes of the masses.

"Now, chromo-lithography, although still in its infancy, promises not to diffuse a love of art merely among the people at large, but to disseminate the choicest masterpieces of art itself. It is art republicanized and naturalized in America. Its attempts hitherto have been comparatively unambitions; but it was not Homer and Plato that were first honored by the printing-press. It was dreary catechisms of dreary creeds. So will it be with this new art. As the popular taste improves, the subjects will be worthier of an art which seeks to give back to mankind what has hitherto been confined to the few.

## Practical Management of Gas Works.

[Written Expressly for this Journal.]

NUMBER TWO.

The ordinary form of retort is the large D, 20 inches broad, 12 inches high (both inside measure), and from 7 feet 6 inches to 9 feet long. The Belgian clay retorts of Keller's make are about 2½ inches thick; and a retort of the transverse dimensions mentioned above, and 8 feet 9 inches long, weighs 1180 lbs. In symmetry and beauty of color, they were for years unrivalled by the fabrics of any American maker, but have been entirely displaced in the market by the improvements which rigid analyses of clays, and improved machinery, have effected in Cis-Atlantic factories.

The energy of Keller's agents, the Messrs. Elliman, of N. Y. City, served to attract the attention of every engineer worthy of the name to the advantage or demerit of clay retorts, and to influence large sales of Keller's fire-goods; but the same energy operated far more beneficially in stimulating our own manufacturers to this branch of industry. In 1858, Mr. J. K. Brick organized large works in Brooklyn, and his example has been followed by a dozen other makers within ten years, of which makers Gautier & Co. are perhaps the best known. The writer has only used retorts from these two factories, and, in distinctly expressing his entire and equal admiration for them, must not be understood as depreciating any of their competitors.

To all practical intents and purposes, the question of clay *vs.* iron is closed. It may be doubted whether, out of the 500 or 600 works in the country, there are 50 which adhere to iron; and if there be 50, they are of the snuff box or microscopic order. "*Exceptio probat regulam*," and one considerable New England company is earning large dividends from iron, but the rule only gains strength from the exception. The Norwich, Conn., works make 7,000 per day per retort, and 4 6-10 cubic feet to the pound, *their retorts lasting two years.* In this case, the settings are Threes, the two lower retorts being 26 inches wide, and the upper one 30 inches wide. "Nothing wonderful!" you will say, "considering the enormous retort-floor." But how long would iron retorts of such size stand a heat capable of delivering 10,300 cubic feet per ton; or how long would an iron retort *of any size* bear it? The writer knows of a company working over 400 retorts, 20 x 12, whose yield per ton is 10,600 c. f.—whose per diem make per retort is 5,400 c. f—whose fuel account is 32 7-10 per cent. upon the coke produced.

Two gentlemen, rejoicing respectively in the *nom de plume* of "Aluminium Ferrum" and of "Experimentum Crucis," once had a wordy dispute upon the subject, which put to sleep many hundred readers of the London Gas Journal. Far from me be any such spinning of rhetoric—such splitting of hairs. I am not fond of Bowditch's hot hydraulic main and condenser; nor of coal tar as a gas producer. From which premise, as by a neat syllogism, flows the point-blank assertion that clay retorts are infinitely to be preferred by any company whose daily summer consumption is 12,000 c f. or upward. It must be confessed that larger storage capacity is advisable with clay retorts than with iron, from the simple fact that irregularity of times of charging ought by all means to be avoided in the use of the former; but a gas-maker who has not paid the most careful attention to this objection will be surprised to find how very nearly it may be neutralized by accurate observation of his consumption-variations, and nice adjustment of his charges to them.

High heats furnish *the* fulcrum which the gas-maker requires; and it is difficult to conceive how any one can advocate irons who has ever looked upon the intense wavy, lemon-color of a well set bench of clays at its full work. No iron on the face of the earth could stand for sixty days the temperature to which clays are habitually driven in every well-ordered gas work in the country; and to advocate iron is to advocate low heats—low, at least, by comparison.

Chemists may theorize about the injurious effect of high temperatures in producing the bi-sulphide of carbon, and increasing the nuisance of graphiten the retorts; but the first is, despite Dr. Letheby, the merest bagatelle; and it is by no means ascertained as yet what is the true and fundamental cause of carbonaceous deposit.*

* The question of the bi-sulphide of carbon is thus disposed of by Mr Versmann, one of the ablest chemists in London.

An extended series of experiments upon the Commercial Company's gas gave 2.99 grains of free sulphur in each 100 cubic feet—in other short experiments the same company's gas gave 6.85 grs. per 100 cubic feet. Similar trials of the Chartered Company's gas gave an average of 9.41 grains.

The result of these experiments, then, is that the gas contains in 10,000 parts *by weight* 1.2, 2.6, and 3.8 parts of sulphur—and 10,000 parts *by volume* 0.236, 0.480 and 0.747 parts of bi-sulphide of carbon; or to give a practical illustration, 100 cubic feet of the gases respectively disengage the same amount of sulphur as three, seven, or ten lucifer matches.

Grafton's oft quoted experiments determine the point that pressure operates very largely to the formation of carbon; and it is even suspected that high heats have little to do with it, except as they increase the back-pressure by their more rapid evolution of gas.

The use of fire-clay facilitates the employment of wide retorts, regarding the superior advantages of which, two opinions can hardly exist. The distillation of coals in a thin stratum, at high heats, and on short periods may be accomplished by them; and the increase per retort in labor and fuel accounts is no way commensurate with the improvement in yield of gas per retort and per ton. In case of emergency, by sacrificing a couple of hundred feet per ton, a clay retort of large horizontal surface may be driven to a per diem capacity such as is utterly unattainable by the other material, and worked continuously at a glittering intensity of heat to which no iron retort could, with impunity, be subjected for twenty-four hours. Clegg's ingenious "Web-Retort" would not have had birth, if its author had ever used a first-class 30 inch clay retort made in a single piece.

Instances have occurred in which the mouth-piece has weighed as much as 300 lbs., while, on the other hand, the same castings, in an inter-tropical gas-work, weigh no more than 185 lbs. The latter were very short, were cast with a socket to receive a 6 inch stand-pipe, and were abundantly strong. Opinions are divided as to the relative merits of a flanch or a socket joint at this point; but the writer leans strongly to the latter, on account of the *certainty* which it affords of a gas tight connection.

It was formerly the custom to employ T headed bolts for securing the mouth piece to the retort, but the plan is now abandoned in favor of a bolt carrying two nuts, one of which is dropped to its place in the retort-shoulder before inserting the bolt, the mouth of the slot being made good with the same cement as is used for the main joint itself.

In making the mouth-piece joint, it is a very usual practice to set the retort on end, mouth up, as in this way greater ease of access to the joint is obtained, as well as greater facility of adjusting and securing the bolts in their slots The weight of the mouth-piece also acts to the uniform compression of the cement, and some minor advantages attend the plan.

Again, Messrs. J. K. Brick & Co. recommend the following plan where their retorts are used:

> *After the retorts are laid and walled in*, then put on the mouth-piece with the mastic described below. Be careful to have mastic enough prepared for only one mouth-piece five minutes before you have use for it. Prick the front of the retort with a sharp hammer; this done, spread the mastic over the surface of the head of the retort with the hands as rapidly as possible. Leave no part uncovered. The mouth-piece may then be placed on, and forced up to about ¼ inch joint by means of an ordinary screw-jack, making the outer wall of the retort house a fulcrum for the lever or beam. Make the inside and outside joints smooth with a small trowel, cover them with red lead, and the operation is completed. The bolts should be secured, and the bolt holes filled in, with a mixture composed of one-third finely pulverized clay, and two-thirds fine sawdust, thoroughly incorporated; this will prevent the cracking of the retort by the expansion of the bolts.

But the less a retort is handled after the heavy mouth-piece is attached, the better; and I prefer a middle course, as avoiding this objection to the first plan, and ensuring a more thorough support to the mouth piece, during the operation, than is possible with the second.

It is to lay the retort on cross-pieces of scantling in the retort-house, exactly opposite to its bed, and make the joint there, reaching the lower part of the joint by gently rolling the retort over. After the joint has had time to set and harden, the retort is lifted by a strap or sling, and touches nothing that can jar it until it is fairly on its bed.

It will very frequently occur that the position of the working benches is such as to render this plan obstructive and impossible; and, after all, it matters little where or how the joint is made, so it be secure when the retort is in its place

The recipes for the cement to be used in making mouth-piece joints are various; it is not, however, in the power of the writer to state the absolute efficiency of any, and the general experience of engineers seems to be that a slight amount of leakage at this point is unavoidable during the first week of charging, at the expiration of which period the tar and infiltrated carbon will usually have made the joint perfectly sound.

The following mixtures come most highly recommended:

> "A mortar of iron cement, *without sulphur*, is mixed with an equal weight of fire clay."—*Clegg on Coal Gas, 4th Edition, pp* 131–2.
>
> "A mixture of three-fourths fire-clay, and one-fourth iron borings."—Jos. A. Sabbaton, *Engineer Manhattan Gas Light Co.*
>
> "Five parts fire-clay; five parts borings; one part sal ammoniac; three quarter part sulphur (pow-

"dered). Mix these with ammoniacal water, but "not before you are ready to connect the mouth-"piece to the retort."—J. K. Baick, *late Engineer Brooklyn Gas-Light Co.*

Before alluding to the settings, a few remarks having specific application to the construction of the furnace, or fire bag, are appropriate

For many years its was the custom in this country to use a furnace of the clear width of 12 inches, preserved continuously from the ash-pan, past the grate bearers, to or above the level of the surface of combustion. Careful observation has, however, more recently decided that a large surface of combustion, relatively to the grate-space, is advisable, as securing a more perfect utilization of fuel, nor is this all.

The advantages of splayed furnaces are two-fold in their character. In the first place, as has been said, they secure, by increased relative fuel surface, a completeness of combustion which ensures the maximum efficiency of the fuel employed. In the second place, the haunches of the furnace keep the inflowing current of air in the central portion of the mass of fuel, and clear of the side walls, and so prevent the rapid destruction of the latter, which occurs where they rise directly and vertically from the grate.

And in this connection it may be observed that when the flame ascends directly from the furnace, and passes easily into the arch from beneath the top retort, much permanence is secured to the side walls of the furnace. In some settings of clays, and—it is believed—in all settings of iron threes, the flame is deflected from its natural upward direction through side-ports which open into flues which traverse the bottom of the lower retorts. As a direct and necessary result, a cutting action at once occurs at these side-ports, and speedily and increasingly vitiates the form of the furnice, and the durability of the whole setting. Now, when iron retorts are used, this feature is hardly objectionable, as the furnace becomes gradually assimilated to the most efficient form, and the destruction of the setting is not so rapid as to shorten the brief life time of the retorts But when a setting is to last three years (which is, I believe, the greatest recorded duration of clay retorts in American practice) these objections assume an importance which must consign the method to the tomb of the Capulets.

The purpose of the ash pan is generally represented (additionally to the reception of the falling cinders) as being the cooling of the fire-bars, and their consequent preservation, by the evaporation of the water which it contains. Now it is very true that this is *one* function of the ash-pan; but it performs another at least as important.

The water being evaporated by the heat radiated downward, its vapor is carried up through the incandescent fuel, and so decomposed.

The resulting hydrogen and oxygen combine variously with the carbon of the fuel to form new and calorific gases, by the combustion of which, as shown by the experiments of Bunsen and Fyfe, a marked quantity of heat is gained over that lost in the production and decomposition of the vapor. With improper firing, or an ashpit of too great depth, this advantage cannot exist.

It is too often the practice to crowd the furnace full of coke—a practice usually traceable to the ignorance or prejudice of the stoker, and which is as repugnant to the true conditions of combustion as can possibly be conceived.

The stoker will tell you that the frequent opening of the furnace door chills his heats, and that a large mass of fuel gives off more heat than a thin stratum. The former remark is to some extent true, for the opening of the furnace door does, *momentarily*, operate as mentioned; while the latter is true, just so far as a thick fire is better than no fire at all. But the true line of practice is to keep the fire of such thickness as will completely, and with useful effect, strip the oxygen from the inflowing air. "Thin fires, frequent fires and a large surface of combustion" is the motto; and it may be asserted that for one who errs by carrying this principle to its extreme, an hundred err by not observing it at all. J. R. S.

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Bursting of a Reservoir at Preston.—The London *Builder* of November 30, says: A very alarming accident has happened on the premises of Messrs. M'Guffeg, cotton manufacturers, Preston. The establishment of the firm named has at the rear of it two lodges or reservoirs for warm water. One of the lodges is a new one, and about six weeks ago, when it was being filled, it burst through the breaking of an iron pipe. Since then the contractor has repaired the breach, and steps were again taken for filling it. The lodge is about 57 feet long, 37 feet broad, and 7 feet deep. When the water had got about a foot from the top, the northern wall of the ledge, which is about 14 feet high, 5 feet 6 inches broad at the foundation, and 3 feet at the top, gave way in the centre; an aperture about 18 ft. wide, and reaching from the bottom to the top of the wall was made, and through it all the water rushed with great impetuosity, deluging houses and streets in the vicinity.

## General Summary.

[Compiled for the American Gas-Light Journal.]

The San Jose (Cal.) Gas Co. has given notice that on and after the first day of January, instant, the price of gas to consumers will be reduced from nine to eight dollars per thousand cubic feet.

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The Liverpool (Eng.) Gas-Light Co. are constructing a gas-holder of 240 feet diameter and 70 feet high, with a capacity of 3,100,000 cubic feet. Their maximum daily consumption during 1867 was 7,250,000 cubic feet.

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Mr. Banister, in his very useful book on "Gas Manipulation," determines as a fact that through union-jet or batswing burners, when the pressure is below six or seven-tenths of an inch of water, the discharge is almost *directly as the pressure*, instead of being *as the square root of the pressure.*

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The Jersey City Water Rates yielded during the year ending July 1st, a revenue of $150,193.08, an increase over the preceding year of $8,283 56. The total expenditure during that time was $145,252.80; expended for the extension of the Water Works during the year $67,766.65. The total amount of revenue received since the introduction of Passaic water in 1854, is $1,085,137.48.

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Gas-Lighter.—Mr. S F. Clouser, of San Francisco, has invented a patent gas-lighter, which dispenses with the use of matches or fire in any shape. As we understand it the burner is made of a peculiar metal alloy, the composition of which is kept a secret, and the moment the stop is turned and the gas comes in contact with it, ignition takes place through chemical action.

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Improvement in Packing Cases.—A New York mechanic has made improvements in packing-cases, the object of which is to prevent them from being opened surrepticiously. The patentee makes to fit around the edges or corners of such packing-cases pieces of sheet iron, the edges having been previously bent to fit into corresponding grooves or slits made in the wood to receive them.

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Telescope for Examining Objects Under Water.—A new telescope intended for examining objects situated under water, was recently tested on one of the French canals. Reports affirm that pencil marks could be clearly distinguished at a depth of more than five feet. Its practical application will be the examination of the hulls of vessels without its being necessary to dock them.

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A Cork Gasometer.—The Cork Gas Consumers' Co. says the *Builder*, have completed their new gasometer, which is said to be the largest in Ireland. It is a plate-iron cylinder, 154 feet in diameter, by 25 feet deep, and has involved many thousand cubic yards of excavation, and an amount of masonry and other work, which for the past nine months has kept about 120 tradesmen and laborers of the city at daily work. Mr. Anderson, the engineer of the company, furnished the plans for the work, and it was carried out under the personal direction of the manager, Mr. Still. The entire staff of the works, about 200 in number, dined in it the other day.

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Lighting Gas by Electricity.—We learn that Mr. Samuel Gardiner has placed his electro gas lighting apparatus in the picture gallery of A. T. Stewart, Esq., it being a part of the magnificent mansion which he is to occupy, on the Fifth Avenue. The number of burners is 325. The room was instantaneously lighted on the evening of the 19th December, and was decided by those present to be a perfect success. From the street the view was magnificent, the reflecting light being seen at the distance of several blocks. On turning the gas on and off the effect was like that of repeated flashes of lightning. In the Gardiner machine each burner is lighted by means of platinum wire, made red-hot by means of an electric current.

Gas and Air Purifier.—Mr. John Reid, the manager of the Edinburgh and Leith Gas Company, read a paper before the Royal Scottish Society of Arts, in the early part of December, and which has been issued in a printed form, in which is a description of a revolving washer for removing certain impurities from gas in the process of its manufacture, and applicable to the purification of air, and for other sanitary purposes. The leading idea of Mr. Reid's improved washer, says the *Builder*, is to employ a horizontal instead of a vertical passage for the gas while being submitted to the action of the shower of water, whereby it should undergo a thorough shower-bath from a copious stream of water jets, falling some 20 inches, in an elongated horizontal chamber, instead of 30 feet in height; and that this should be effected without in any way presenting obstructions to its free passage, or throwing any back pressure on the retorts. He also proposes, by aid of his apparatus, to purify air for sanitary purposes, by means of Condy's fluid, otherwise known as "ozonized water."

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Heating Rail Cars.—Two cars fitted with steam-heating apparatus are running on the New Haven railroad, and two more of an elegant description, divided into compartments after the English style, are building by Wasson & Co., of Springfield, for the same road, to be similarly heated. A small apparatus for generating steam occupies a corner of each car, and from thence iron pipes are fitted near the feet of every passenger, the principle being that observed in applying bottles of hot water. It is said that the plan is entirely satisfactory and pronounced feasible. The cost for each car is about $400, but the consumption of fuel is trifling (only two or three hods of fuel between New York and Boston), and the comfort obtained is solid. The apparatus is known as Baker & Smith's patent. Since the terrible accident on the Lake Shore railroad, there is a general demand that stoves in railroad cars should be abolished.

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A "Sailing Carriage."—There is a newly-invented "sailing carriage," designed for use on the New Mexico route. It has two upright jib sails, and a sail on each spoke of the two wheels on one side of the wagon, with steering gear acting on the forward side, and provision for transferring the wheel sails to the opposite wheels. The inventor is Charles P. Maczowitzky, a German, who has been a sailor, and has since spent several years in traversing the plains. He lies upon the ascertained constancy of the prevalent winds on the great plains over the route named. The wheels are ten feet high, the wagon body shaped like a long boat and hung low, and with the jib sails, the whole concern presents an odd and formidable appearance. The design is to take passengers and mail matter only—not freight—and it is expected that the carriage will suffice as a boat in crossing streams.

## Brevities.

—Media (Pa.) is clamoring for gas.

—There are two thousand miles of gas pipes under the streets of London.

—In the day time the inhabitants near Fort Bridgar Colorado, skim the creek for kerosine to burn at night.

—An oil well producing over seventy barrels per day has been struck on Shaffer run, near Oil City, Pa.

—A rough diamond found at Camden, Miss., during the war, has been found to be worth $50,000.

—A fortune is waiting in Peru for the man who will invent a method of solidifying guano for exportation.

—Cars with family compartments, fitted up in hotel style, with attendants, are to be run between New York and Chicago.

—A man in Kokomo, Indiana, in boring a well in his cellar, struck a vein of gas, for which he provided tubing, and now uses it to light his house.

—The dam across the Illinois River at Marseilles, Ill., is stated to be 936 feet long, and contains 218,000 feet of timber and 11¼ tons of spikes and bolts.

—Boring for coal oil at Lawrence, Kansas, recently, a quantity of brine spurted up, and the best of salt is now made from the product of the well.

## Late Mining News.

[Compiled for the AMERICAN GAS-LIGHT JOURNAL.]

—In Tuolumne county there are quite a number of quartz claims being purchased at the land office in that district.

—During the past season the Empire on Ophir Hill, Nevada, has been worked with profit to the owners. The ledge continues to increase in width and the ore to assume a more uniform paying character, the deeper the work is prosecuted. It costs about $10,000 per month to run this mine, but the average yield from the rock will not fall far short of $40,000 per month.

—The Nevada *Transcript* says a rich quartz ledge has been discovered in Pleasant Valley. The mine is located half a mile above the Scandinavian in Deer Creek. The ledge is two and a half feet thick, and the rock contains a large quantity of free gold.

—The Amador *Ledger* says that a party of Austrians have made a very rich discovery of quartz on Jackson Creek, about two miles above Amador. The rock is represented as being extremely rich. One piece the size of a goose egg produced $10 in free gold.

—Col. Stevens is putting up a furnace at Lone Pine Inyo county, for a New York company, which is calculated to reduce from six to eight tons of ore in twenty-four hours. He has 250 tons of ore ready for smelting, which is expected to yield $60 to $70 per ton. Inyo county is south of Mono and east of Tulare county, and lies at the eastern base of the Sierra Nevada mountains.

—In the White Mountain district there has not been much done in the way of reducing ore, but shafts sunk to a depth of 60 or 70 feet have proved the veins to be permanent. Some ore from the Cinderella mine taken to San Francisco, yielded $110 per ton—$70 silver and $40 gold.

—A few months since a gravel mining claim located on the Ridge in Nevada was purchased by a gentleman for $9,000. He sold it recently for $12,500, and after the first run of twelve days the purchaser took out $4,500 in gold.

—The Grass Valley *National* says that there is now being crushed at the Sebastopol mill 200 loads of rock from the Eureka ledge which is estimated will pay from $50 to $60 per ton.

—The country about Eureka South, says the Grass Valley *Union*, is literally veined with quartz lodes flat rock and croppings presenting themselves on every side, but the principal paying quartz mines have been found between the North and South Forks of Poorman's Creek, and between the South Fork and Canon Creek, lying south of the town of Eureka.

—The San Andreas *Register* says that the quartz mines of Calaveras are beginning to attract on attention which promises an early development of wonderful wealth. The county is lined with veins of the best paying rock in the State.

—The Alpine *Miner* says that all is activity and life in and about three of our mines in particular. The Tarshish, Morning Star and Merrimac are mining.

—The Empire Co. cleaned up $27,000, being the result of eighteen days work. This is said to be better than the run made in October, when $27,000 were obtained from twenty days rub. The monthly expenses of this mine is $11,000, leaving a very handsome dividend.

## PATENT CLAIMS.

**Pertaining to Gas, Mining, Petroleum, Water, etc.**

72,455.—TRAY FOR GAS PURIFIERS.—B. E. Chollar, Leavenworth, Kansas.

I claim, 1. A purifying tray, substantially as shown and described, and for the purpose set forth.

2. The grate-bars *a*, in combination with the pectinated bars A, and the binders or clamps B, substantially as shown and described, and for the purpose set forth.

71,545.—GAS-BURNER.—John Scholl, London, Eng.

I claim the application and use to and in gas-burners, substantially as hereinbefore shown and described, of a narrow and thin strip of platinum, for the purpose set forth.

72,559.—GAS FIXTURE.—William Mont Storm, New York, N. Y.

I claim the sliding "hood" and rod *e*, in combination with the burner, and operating simultaneously with the cock, the whole acting substantially in the manner and for the purpose set forth.

72,616.—LIGHTING AND EXTINGUISHING GAS.—Moses G. Farmer, Salem, Mass.

I claim the combination of a straight, electro-magnetic bar, with its pole situated between the poles of two bent U shaped permanent magnets, which permanent magnets may be either simple or compound.

Also, for use, in combination with the gas-burner of a street gas lamp, a box or gas chamber, containing an electric spark generating mechanism, and mechanism, as described, for opening with the current in one direction, and closing with the current in the opposite direction, a valve, said box containing gas, and being arranged to be located at or near to the burner, and in a circuit, substantially as set forth.

Also, giving motion to gas-valves, or other mechanism, by means of the above described combination of electro and permanent magnets, whether the arrangement be such that the permanent magnets, or the electro-magnetic bar, be moved by the reversal of the current.

Also, the arrangement of the burner, the igniting-points or wires the gas-valve, the primary and secondary coils, and the electro and permanent magnets, substantially as shown and described.


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**For Wet Meters. Gasoline Machines, Hydraulic Press; Etc.**

WE WISH TO CALL THE ATTENTION OF GAS COMPANIES, and the Public generally, to our well-known GLYCERIN, which we are prepared to furnish as heretofore, as the most suitable, cheapest, and best preservative against Frost in Wet Meters, and for similar purposes. The experience of several years leaves no doubt about the superiority of our Glycerin over every other fluid applied to the same purpose.

For particulars apply to our Agent in New York, or at our office, where we keep a great number of certificates from Gas Companies on file, for reference.

HARTMANN & LAIST,
Cincinnati, Ohio.

☞ L. BRUCKMANN, 67 Wall street,
Agent for New York. 86-6mths.

OSBORN MANUFACTURING COMPANY,
109 Bleecker street.

Patent Bird and Animal Cages. *No Paint* used in their construction.

*VERMIN PROOF! ALL METAL!*

Received highest premium at the Fair of the American Institute, and N. Y. State Fair of 1867. Trade supplied.

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**The Cameron Coal Co.,**

MINES LOCATED AT

***Cameron, Cameron County, Pa.***

**New York Office, 42 Broadway.**

S. L. SIMPSON, President.

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| Fletcher Westray, | Paul Spofford | Wm. A Sale, |
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| Lawrence Myers, | Samuel N. Pike, | John L. Rutgers. |

The Company are prepared to fill orders at the lowest possible prices for their Coal, which BY ACTUAL TESTS PROVES TO BE EQUAL TO ANY OTHER BITUMINOUS COAL MINED FOR GAS PURPOSES, and it is equal to any in use for Locomotives and steam purposes generally.

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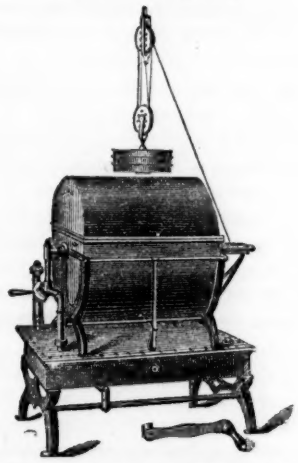

We manufacture eight sizes of the SOLAR GAS MACHINE, ranging from ten to five-hundred light capacity. Every machine is put in operation and fully tested before it is sent off, and is guaranteed to give perfect satisfaction. This new apparatus is the result of 15 years of experience in this special line of manufacture, and we feel warranted in asserting that our machine excels all others of a similar kind in the market. It is much simpler and more efficient than any former manufacture, and is constructed with special reference to safety and durability. There is no possibility of an explosion under any circumstances whatever, nor is the gas tank likely to leak or give out, or any part of the machine to get out of order, if reasonable care is taken of it. From five to fifteen minutes' attention is all that is required to keep any size of machine in perfect working order to supply all the burner-jets in a dwelling or factory.

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Yours respectfully,
WM. C. BARNES.

BOSTON, Aug. 22, 1867.

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Gentlemen: I purchased of you, Nov. 18, 1865, one of your Solar Gas Machines, for my house at Auburndale; and from that time until the present, I have enjoyed uninterrupted success with it. The light is uniform, clear and steady, and the best I have ever seen. I have never experienced trouble of any nature from the machine, and consider it invaluable. As to its safety as compared with any other illuminator, I consider it far superior, and have discarded everything else in the shape of oil, fluid, kerosene, etc. Hoping your invention may prove remunerative, I remain,

Yours respectfully
W. E. PLUMMER,
53 Merchants' Exchange.

LAKE FOREST, ILL., Aug. 30, 1867.

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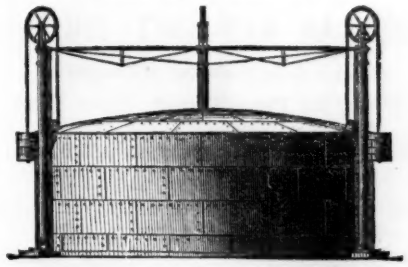

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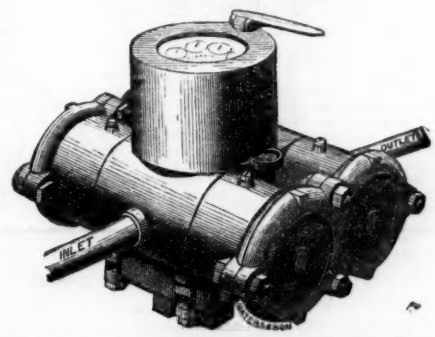


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AND

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Published on the 2d and 16th of Each Month

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M. L. CALLENDER & CO.,

EDITORS AND PROPRIETORS.

THURSDAY, JANUARY 16, 1868.


WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

SUBSCRIBERS would confer a favor upon us by remitting CHECKS or POST OFFICE MONEY ORDERS, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

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☞ Owing to a change in the ownership of this Journal, the firm will hereafter be known as M. L. CALLENDER & Co.

## Answers To Correspondents.

S. A. B., of Ohio.—Aniline is obtained thus: the benzole obtained by the distillation of naphtha obtained from coal, is converted into nitro-benzole, by mixing it with nitric acid. It is then impregnated with hydrogen in a nascent state, by adding iron or zinc scraps to the nitro-benzole, and pouring into it some sulphuric acid. In this manner aniline is formed, which is the base of those beautiful colors—mauve, magenta, solferino, etc.

P. G., of Ill.—The pressure of the dip-pipe seal does certainly obstruct the free evolution of gas, and is a considerable agent in robbing the gas of valuable carbon. Many devices have been advanced for the avoidance of this seal, but obvious difficulties of a practical nature have prevented their adoption. The whole subject will be reviewed at length in an early number.

L. N. O., of La.—Adjustable valves have been employed in hydraulic mains to regulate the hight of tar. Herring & Floyd, of this city, have an excellent device for this purpose, which they introduce in works they erect.

P. A., of Cal.—Most of the tin used in the U. S. comes from the island of Banca, in the East Indies. Cornwall, England, has been famous for its tin, and considerable is still obtained from that source, annually. The ores are smelted in a crucible with pulverized charcoal and a little borax. A three-inch vein can be worked profitably.

S. A. T., of Mass.—The assignee of a part of an original patent would have no right to any part of an improvement subsequently made and patented, unless there was an agreement made to that effect. Brass can be prevented from tarnishing in the open air by covering it with a varnish. Canadian balsam dissolved in turpentine, will make a good transparent varnish for this purpose.

## GENERAL TOPICS.

THE recent terrible disaster at Angola furnishes its own moral, and speaks more earnestly to the inventors and the railway corporations of the country, than any words of ours can possibly speak. We do not propose to revive the ghastly story which has flowed in tragic speed to every hearthstone in the land, nor to pronounce upon the original cause of the disaster;—we only desire to suggest that it is no very difficult matter to devise some safety-stove such as shall completely avoid any possibility of a second holocaust. No sleeping-car, however deftly arranged, or luxuriously provided, can prevent nightmare in the presence of such inanimate demons as are the vast majority of railway stoves; they act rather as aggravations of the dreams which in some form or other of latent presence every railroad traveler cannot but carry about with him just now. Let us by all means, have a stove which no possible amount of upsetting can empty of its burning contents.

It may also be observed, that the miserable manner in which our cars are generally lighted adds very much to the discomfort of traveling. Reading is out of the question, and valises become volatile after dusk; while for nearly half of our railway life cleanliness and dirt appear alike to us. Few problems are physically impossible, and we are not without a hope that the three questions of the deposition, under pressure, of the hydrocarbons—of an efficient high pressure regulator—and of suitable burners—will be so successfully investigated as to secure the adoption of gas-light in every railroad car from Maine to California.

We are among the victims of the financiers, in little, who operate in the dim, but irreligious, light which now prevails; and there may be selfishness in our hopings. Still, there are many who will sympathize with us, and echo our wishes.

WE regret to say that our engineers seem, as a body, somewhat apathetic upon the subject of the proposed Convention. One cause of this fact arises, very probably, from the engrossing duties which a severe winter must always bring with it to those who are conducting works of moderate size, and among whom the stoutest advocates of the scheme might reasonably be looked for. When meters cease to freeze, we trust that the ideas of our gas-makers will thaw out on paper.

It is none the less certain that the plan is pregnant with good to those who may participate in its accomplishment. Many, if not most, of the questions which perplex the neophyte have found simple and complete analysis at the hands of his seniors, and his untutored criticism of them will not unfrequently react to the benefit of his teachers. And if only as begetting an *esprit du corps*, and a general courtesy and kindliness, the proposed Convention will secure valuable results.

The united advocacy of a dozen prominent engineers will suffice to give it definite promise of success. There are cases in which silence is *not* "golden," and this is one of them. The GAS-LIGHT JOURNAL is, however, heartily pledged to the scheme, and will do what is possible to promote it, trusting to find more valuable, because more interested, coworkers.

A dozen monograms upon a dozen of the vital points of gas engineering might be entrusted, by vote, to the execution of as many of the very best of our engineers and it would be found that they would embody the soul—the very essence—of bulky volumes which—what with advertisements, and rhetoric, and impervious bigotry—do cumber the patience and the shelves of the wealthy engineer, but which at the same time contain very pearls of information and thought, from which the humbler gas-maker is now debarred.

The report of the celebrated arbitration case between Croll and the Great Central Gas Consumers' Company, for instance, does actually contain more useful information to the *manager* of gas-works, than the last elaborate edition of Clegg. It presents, as under a smutted kaleidoscope, the shocking effects of a disregard of the Latin maxim, "*Festina lente*," or the Arabic one, "Hurry is the devil's." Plugs left out, almost by preference, in laying mains—invisible heats in settings of twenty-twos—countless stand-pipes of 1-inch diameter flaring by night all over the district—gas given away—stalagmites in the wet-lime purifiers—holes, other than those originally contemplated, in the clay retorts, mix curiously with muscular battles in the trenches and intellectual battles in the courts until the whole becomes more sensational than Frankenstein, or the closing butchery of the Nibelungenlied.

Enter to this grotesque chaos the very best engineering and chemical talent of Great Britain, and by dint of those persistent corkscrews, the Umpire and the counsel, is extracted a fund of practical information such as no other book yet published can possibly afford.

We have alluded to this report to warrant the assertion that a digest of it is at once important and easy, and could be executed with great propriety under the auspices of such a Congress. Among the smaller American companies it is almost totally unknown, in spite of its varied merits.

But our only object now is to give a sample of what may be accomplished by the scheme proposed. That it will invest the art of Gas-Lighting with a new vitality and progress; that it will link old friendship and beget new ones; that it will cause an interpenetration of the interests which, through prejudice and reserve, are now merely local; that it will spur the lazy (if any such there be) and the industrious alike, are facts as axiomatic as that two and two make four.

We hope that our remarks will serve to stimulate the discussion which has begun; and we hold our columns open at any time to those who desire to express their views in this connection.

Our next issue will contain a curious article by J. R. S., on the Manufacture of Wood Gas by a considerable southern company, during our late war.

## THE PANCRAS STATION OF THE IMPERIAL GAS CO. OF LONDON.

The Imperial Company, whose operations have been the largest in Great Britain, has three gas-works—the Pancras station; the Hackney Road works; and a third establishment at Fulham.

We find that at the great Pancras Station are nearly 600 retorts, 20 feet long, or nearly 1200 "mouth-pieces," the retorts being worked from both ends. These are set 10 in a bench. Only about 500 tons of coal can be carbonized daily—the retorts being Ω-shaped, 21 ins. x 13 ins. The condenser consists of 10 columns or pipes, each 3 feet 6 ins. in diameter, and painted red. There is no internal air-pipe, and water is allowed to trickle over the condensers while the sun is out. The whole make of gas at these great works, running to a maximum of nearly 5,000,000 c. f. per diem, passes through this condenser, whose surface can hardly exceed 3,500 square feet. The gas, however, traverses a considerable length of pipe before entering it. Powerful condensers seem to be objected to by many English engineers on the ground that they impoverish the gas by undue precipitation of the hydrocarbons in the shape of tar.

The exhausters are simply reciprocating pneumatic

pumps, composed of a sheet-iron cylinder, open at tne bottom. and having a flap valve opening upward at the top, working up and down in a tank of water around the rising end of a pipe which admits the gas through a valve, also opening upward at its top; the whole apparatus being enclosed in a gas-tight case. The friction is considerable, and the fluctuations cause the water-guage and burners to oscillate violently In these works, as will be inferred from the order in which we mention the condenser and exhausters, the former is placed next to the hydraulic main. The exhauster-room shows an amount of taste and scrupulous neatness which the commercial man would deem strangely out of place in a gas-work. The inlet guage shows a vacuum of 1 inch; the outlet, a pressure of 24 inches. The gas passes the exhauster at a temperature of from 70° to 80°. From these it passes to a set of four wet-lime purifiers—from these to a set of six purifiers in which sulphuric acid and sawdust is used for the abstraction of ammonia—and finally to two sets comprising eight purifiers for the use of peroxide of iron.

No station meter is used.

At this station, eleven gasholders are in use, with a total storage capacity of 3,850,000 cubic feet. The largest is a single-lift holder, 142 x 55 with a capacity of 870,000 c. f.; while the smallest, constructed many years ago, contains but 32,000 c. f.

The greater portion of the above sketch is condensed from Zerah Colburn's valuable little book entitled "The Gas Works of London."

It will be observed that nothing is said as to the yield of gas per ton, or the fuel percentage. But the former is probably not over 9,400 c. f., and the latter is certainly small as compared with the record which a greater indifference to the coke question affords in American practice.

The most noteworthy points are the low yield of gas per bench, (equal to only 8,500 c. f. per diem, per double-ended retort of 20 feet length)—the indifference to the question of condensation—the use of sulphuric acid—the employment of antiquated exhausters—the disuse of the station meter, and the heavy back pressure due principally to the use of wet-lime.

We will allude in our next to the other stations of this company, and believe that a succinct statement of their features will present a very marked contrast to the const u·tion and results of the larg·st American works, in most points favorable to the latter.

## GAYLORD'S GREAT WESTERN PIPE FOUNDRY.

This establishment is located on the banks of the Ohio river, and is admirably situated, having every facility for the manipulation of iron, coal and the manufactured product, and is in the centre of a large western territory or market. There is a river front of 800 feet, giving ample room for loading and unloading boats and barges. There are three cupolas with a capacity of 75 tons daily. and a blast engine with a capacity for melting 100 tons a day. The specialty is pipe and all other castings for gas and water companies The pipes are cast vertically in twelve feet lengths, and chiefly on the "Robbins' Joint" pattern—a new and important improvement by which the pipe is laid with equal facility by hydraulic power, thereby saving time, labor, and making a more perfect joint.

Messrs. Gaylord & Co. are now engaged in building a wall of solid stone and cement about 40 feet high with a base 13 feet thick, running parallel with their works, along the river at low water mark, their object being to extend their yard room, and facilitate the loading and unloading of vessels. This will be the finest improvement of the kind in western waters. Upon the top of this wall there will be placed three steam cranes, each with a jib 100 feet long. One will be used for hoisting iron or ore, one for hoisting coal, and one for lowering castings on transports.

It is their intention next spring to commence the construction (on the European plan) of two blast furnaces for smelting iron from Missouri ore. These will be located adjoining the foundry, and will be capable of making 60 tons of pig iron daily for their own use. A mammoth hydraulic crane for hoisting iron and fuel up to the cupola has just been completed. It was undertaken as an experiment, but works admirably. They gave employment last year to 240 men, but intend to employ more, as it is their wish to increase their product one-fourth.

## AMERICAN AND FOREIGN PATENT AGENCY.

Having perfected arrangements, we are now prepared to offer our services to inventors as solicitors of American and Foreign Patents. We have associated with us parties who have been directly connected with the Patent Office for many years, and have acquired an experience in patent matters of over *thirty* years.

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## LETTERS FROM OUR READERS.

We hope our readers will understand that we are always happy to receive communications from them upon all subjects which properly belong to the columns of this Journal. No matter if they are not set forth in fine language, write just as you talk, and give us the facts. We will always take care to put them in proper shape before publication.


**JAMES R. SMEDBERG,**

GAS ENGINEER,

Office "American Gas-Light Journal"

22 Pine Street, N. Y. City.

Refers to Chas. Roome, Esq., Pres. Manhattan Gas-light Co.

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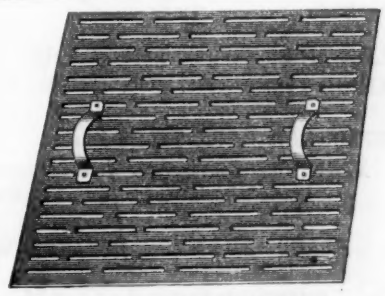

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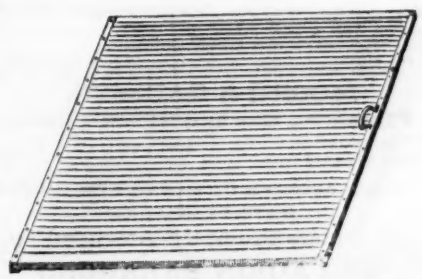

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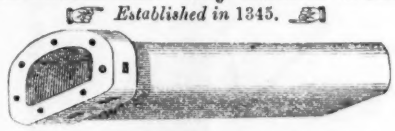

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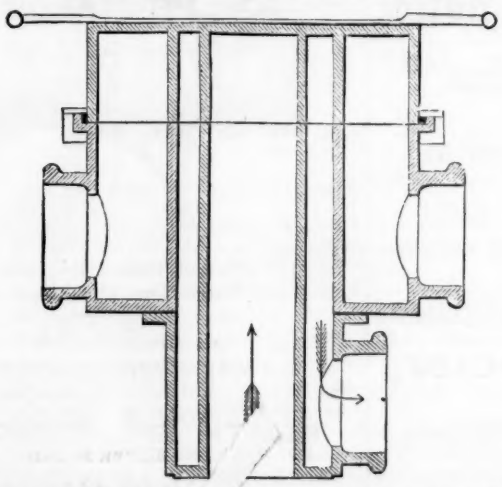

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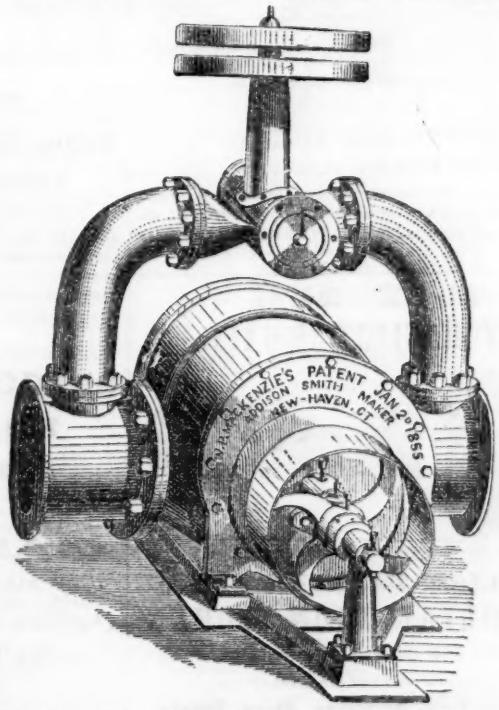


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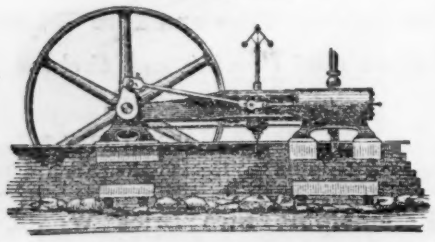

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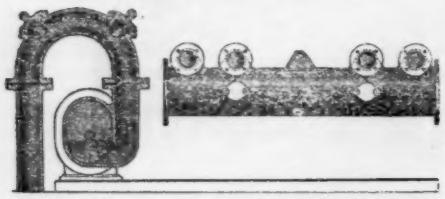

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Fig 5

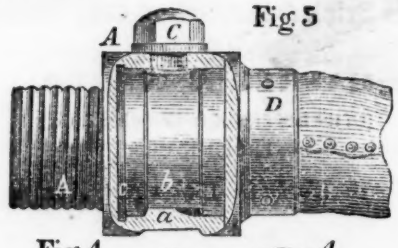



Fig 4

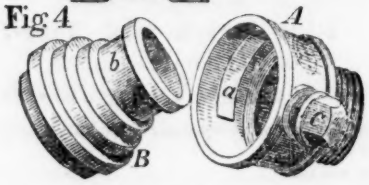
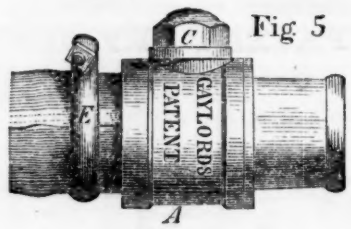



Fig. 5

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PATENT LEAD-INCASED TIN PIPE COSTS LESS THAN LEAD PIPE AND IS MUCH STRONGER.

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CASTINGS, STATION METER, ETC. — THE Wilmington (Del.) Gas Company having enlarged their works, have the following articles for sale:

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Will not crack or break from sudden changes of temperature, is readily cleaned, and with ordinary care should last just as long as the lamp on which it is used. Liberal discount allowed to the trade. Samples sent on receipt of fifty cents.

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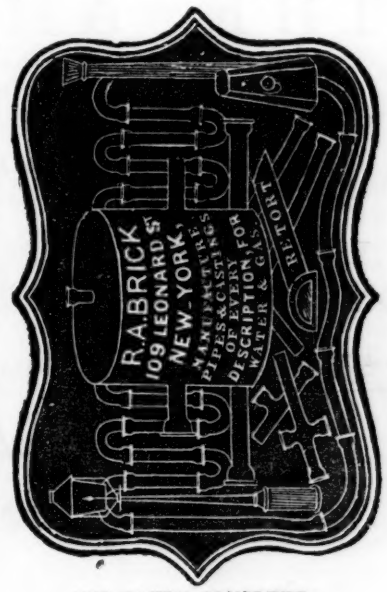


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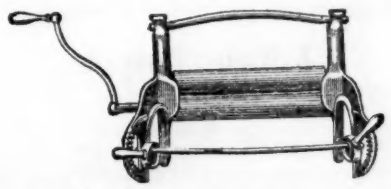

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That Iron well galvanized *will not rust.*

That a *simple* machine is better than a complicated one.

That a Wringer should be *self-adjusting, durable, and efficient.*

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*From our long Practical Experience of the Business (covering a period of 20 years) and from our personal supervision of all Work, we can guarantee all orders to be executed promptly, and in every respect satisfactorily.*

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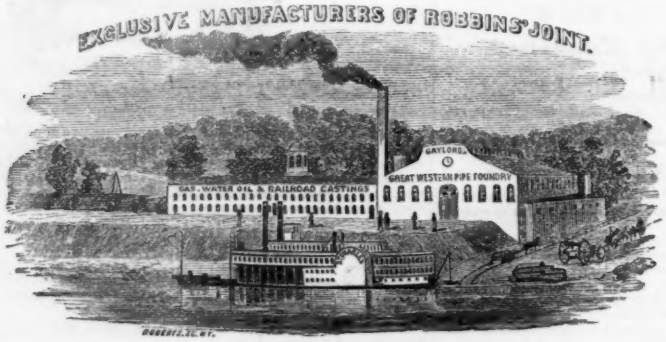


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**SHUTTLE MACHINE!**

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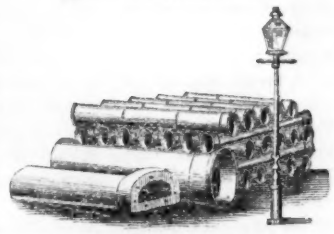

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66tf D. N. CARRINGTON, Agt.

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A New Process.—A Joint Stock Company has been formed at Dutch Flat, says the *Enquirer*, with a capital stock of $100,000—one hundred shares of one thousand dollars each—to test Dr. Dozier's process for reducing ores. The first furnace will probably be erected in the Owen's River region. The doctor will soon visit that place, and the work is likely to be commenced at once.

## Composition of Tea.

The analysis of tea shows it to be composed of four different constituents. First, an aromatic, volatile oil, which produces the peculiar odor and flavor. It is of a citron yellow color, floats on water, and when exposed to the air is quickly converted into a solid rosin by atmospheric oxygen. It has such a powerful taste, that when placed on the tongue it spreads over the entire throat, and exerts a painful action upon the nerves. It does not exist in the fresh or natural leaves, but is produced during the roasting process. A hundred lbs. of tea only yield a single lb. of the oil. Second, tea contains a peculiar principle called *thein*, a substance rich in nitrogen, and classed among vegetable alkalies. Stenhouse states that ordinary tea contains about two per cent. of thein; but Peligot has found as much as six per cent. in certain green teas, although this quantity is very unusual. Thein has a slightly bitter taste, no smell, and dissolves in hot water. An infusion of tea, therefore, contains dissolved thein; and if the leaves be of good quality, an ounce will yield about 10 grains. Third, tannin, or tannic acid, a substance so named because it is the ingredient in oak and hemlock bark, which combines in leather in the process of tanning. If a compound of iron (sulphate of iron—copperas, for example), be introduced into an infusion of tea it turns it to an inky blackness, by precipitating its tannic acid. This substance is a powerful astringent, and gives tea its astringent taste and properties. It forms from 12 to 18 per cent. of the weight of tea. When tea is steeped, the three foregoing constituents are communicated to the water; they hence give its active properties to the ordinary beverage. But tea leaves contain, fourthly, another constituent, namely, gluten—which, not being dissolved by hot water, is usually lost with the dregs or grounds. The proportion of this substance is stated to be as high as 25 per cent., so that the leaves, after exhaustion by steeping, are still highly nutritious. In some localities it is customary to eat them.

## Miscellaneous Items.

—It would take a train nearly seven days to run from New York to San Francisco by way of Chicago, going at the rate of twenty miles an hour, and making the usual express stoppages.

—A Bridgeport, Ct., coal company, operating near the Monongahela river, forty miles from Pittsburg, recently took out a lump of bituminous coal sixty feet square.

—At the Hot Spring smelting furnaces, Mono county, Cal., they are using a very superior soapstone lining, which stands the heat far better than the English brick. It is taken from a ledge near Sonora, Tuolumne county.

—Colorado has gained much *eclat* by her fine mineral collection, exhibited at the Paris Exposition. Colorado received a gold medal, while California received only a silver one for each of her two mineral exhibitions.

—The printer is a fair type of the present financial age. He does business on a metallic basis, yet delights in a paper currency and an extensive circulation. He profits by the credit system and favors the broadest latitude in exchange.

—In ancient Greece, as in most modern countries, milk was frequently diluted with water; and Professor Felton says the following method of detecting the fraud was practiced: "A little milk was dropped upon the thumb nail: if the milk was pure it would remain in its place; if not it would flow away."

—The *Tidioute Journal* says a subscriber to that paper wrote as follows: "The receipt of your paper this evening reminds me of the fact that money is necessary to run it. Enclosed find two dollars to pay for next year's subscription." These are our sentiments exactly, and trust many more will make it a point to do the same.

—A western paper contains the following apology: "The editor is absent, the foreman has the toothache, the 'devil' is drunk and trying to drink lager beer out of a boot-jack, the press is out of order, and we ain't well ourselves—so please excuse a poor paper for this week."

—The velocity of steam when flowing into a vacuum is about 1,550 feet per second, when at an expansive power equal to the atmosphere; but when at ten atmospheres the velocity is increased to 1,790 feet; and when flowing into the air under the latter pressure it is only about 650 feet per second.

—In the Valley of the Lehigh, from Glendon to Parryville, there are twenty-three furnace stacks in operation, which produce weekly 4,000 tons of pig iron. To manufacture one ton of iron, two tons of coal, one and a quarter tons of limestone, and two tons of iron ore are required. These works employ over 5,000 workmen.

—The most westerly inhabited point in the United States territory is the island of Atton, acquired in the late Russian purchase. It is in longitude 174° 10′ west from Greenwich, 62 degrees from the western point of Washington Territory, and 120 degrees, or a third of a circumference of the globe, west from the easternmost point in Maine.

—The North German railways have adopted a plan of warming cars, similar to that practiced upon the New York and New Haven road. A special wagon is placed next the locomotive carrying the heating apparatus, from which pipes convey hot water through the whole train.

Almost Fabulous Luck.—The Auburn *Stars and Stripes*, of November 21st, has the following story of a lucky miner: Herrick Robards came to California in 1853. For two years after his arrival he served as hotel waiter, porter and hostler in San Francisco. In March, 1856, he came to the mines, and first worked for wages at Rattlesnake Bar. From 1858 to 1862 he gradually worked his way up the North Fork of the American until he finally located a short distance below Kentucky Bar, where he has latterly met with no opposition, and has held bed and banks of the stream for miles *ad libitum*. Never much ahead, seldom comfortble and frequently sorely pressed and harrassed, Robard's California experience has been far from pleasant. But "it is a long lane that has no turning," and his lane turned on Friday last. On that day he struck a fissure in an old bank claim that rewarded him in a few hours for the privations and sacrifices of years. The fissure in the bed rock was about three feet wide at the top, a little over 4 feet deep, terminated in a rocky bluff about fifteen feet from where it was first struck, and yielded in about thirty six hours digging and washing a little over 813 ounces of gold! Being coarse, washed river gold, from a neighborhood that has always been famous for gold dust, this lot is estimated to be worth $19 50 per ounce, which would give Robards $15,853.50 for three days labor. He took his dust to San Francisco on Tuesday, determined, as he expressed it, to "have every dollar that it would fetch with *fur* allowance to Uncle Sam for '*kinin*' uv it."

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